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May 29, 2020

Kathryn H. Bowman
Louisiana Public Service Commission
Office of the Executive Counsel
602 North Fifth Street (Galvez Building) (70802)
P.O. Box 91154
Baton Rouge, Louisiana 70821-9154

Re: RFP 20-07, X-35523, Louisiana Public Service Commission, ex parte, In re: Audit of Fuel Adjustment Clause Filings for Entergy Louisiana, LLC for the period beginning January 1, 2016 through December 31, 2019 (2016-2019)

Dear Kathryn H. Bowman:

Please find attached London Economics International's ("LEI") proposal to act as an outside independent technical consultant and assist the Louisiana Public Service Commission ("LPSC") with Docket No. X-35523 referenced above.

LEI is uniquely qualified for this role. LEI has extensive experience auditing electric utilities. We are familiar with the Midcontinent Independent System Operator ("MISO") region. We have extensive experience working for regulators across the United States.

There are no actual or potential conflicts of interest for LEI in performing the contractual obligations contemplated in this RFP. LEI is currently working for the Louisiana Public Service Commission in the matter of Docket No. R-35423 (Rulemaking to study Renewable Energy Tariff Options), a matter which is unrelated to the audit of the Fuel Adjustment Clause for Entergy Louisiana, LLC. LEI is not currently working for a utility and/or investor in utilities operating in Louisiana, or any of their subsidiaries. To our knowledge, we are not advising, nor have a financial interest in, any potential bidders in a future competitive procurement for major resources in Louisiana.

If you have any follow-up requests or questions with respect to this submission, please do not hesitate to reach out to me at the contact information below.

Sincerely,

Marie N. Fagan, PhD
Chief Economist
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Proposal responding to RFP 20-06 to serve as an independent technical consultant to Commission's audit of Entergy Louisiana, LLC Fuel Adjustment Clause filings for the period of January 2016 through December 2019 (Docket No. X-35523)

prepared for the Louisiana Public Service Commission by London Economics International LLC

May 29, 2020

London Economics International LLC ("LEI") is pleased to submit this proposal to the Louisiana Public Service Commission ("LPSC" or "the Commission") to serve as the outside independent technical consultant in the matter of Docket No. X-35523, "Audit of Fuel Adjustment Clause Filings for Entergy Louisiana, LLC for the period beginning January 1, 2016 through December 31, 2019 (2016-2019)." LEI is a leading energy consulting firm with over 20 years of experience advising regulators, electric and natural gas utilities, private firms, and specific customer classes across the United States and Canada as well as among international jurisdictions on tariffs, ratemaking, and renewable energy. LEI has worked with regulators on many occasions and has experience testifying on a variety of issues.

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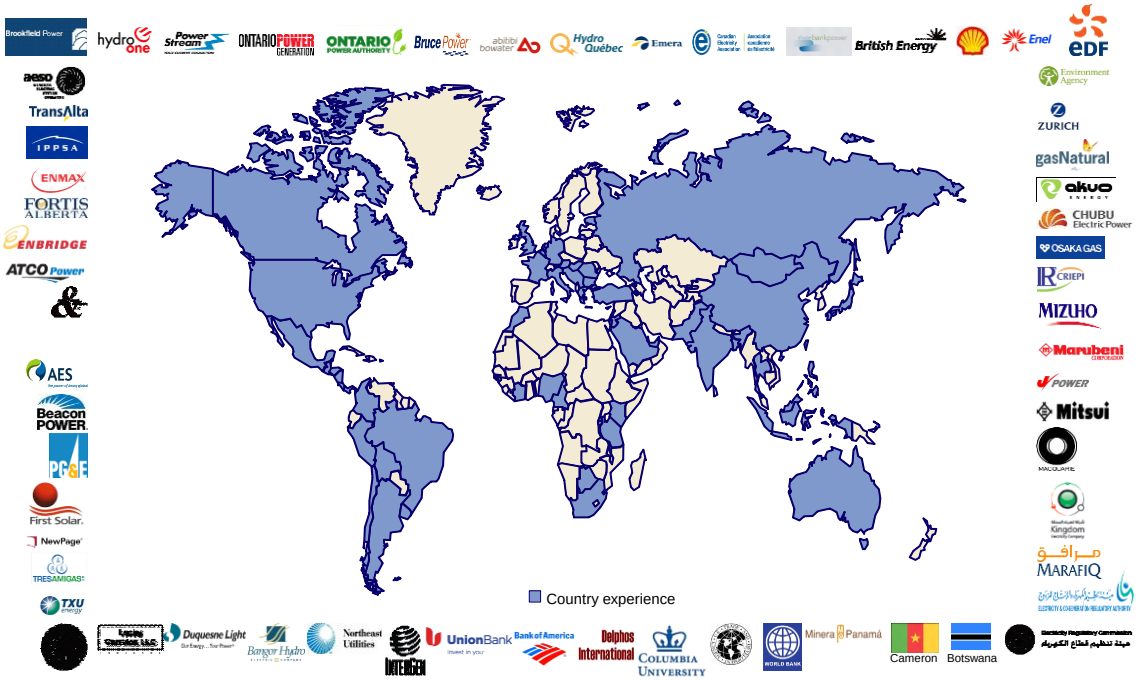
1 Bidder information

LEI is a global economic, financial, and strategic advisory professional services firm specializing in energy and infrastructure. The firm combines a detailed understanding of specific network and commodity industries, such as electricity generation and distribution, with sophisticated analysis and a suite of proprietary quantitative models to produce reliable and comprehensible results. The firm had its start in the initial round of privatization of electricity, gas, and water companies in the United Kingdom. Since then, LEI has advised private sector clients, market institutions, regulators, and governments on policy initiatives, market and tariff design, asset valuation, market power, and policy, and strategy in virtually all deregulated markets worldwide (see Figure 1).

Figure 1. Selected LEI clients throughout the world



The following attributes make LEI unique:

- ***clear, readable deliverables*** grounded in substantial topical and quantitative evidence;
- ***extensive experience with management auditing*** enables LEI to provide benchmarking and comparison to industry best practices;
- ***wealth of knowledge of energy and infrastructure regulation*** worldwide enables LEI to provide expert testimony services on regulatory best practices and innovation;
- ***balance of private sector and governmental clients*** enables LEI to advise both regarding the impact of regulatory initiatives on private investment and the extent of possible regulatory responses to individual firm actions; and
- ***US-wide and worldwide experience*** backed by multilingual and multicultural staff.

1.1 Background and staffing

LEI is extremely well-qualified to serve as a technical consultant to the LPSC. As described in detail in Section 2, LEI has direct experience conducting management and compliance audits; the firm has broad experience in regulatory economics and cost allocation, including analytical and audit capabilities. LEI understands the regional power market in the Midcontinent Independent System Operator ("MISO") region, producing semi-annual market outlooks based on LEI's detailed production simulation model of MISO. LEI also understands the perspective and objectives of state regulators, having worked with many regulators. The firm has experience providing testimony to state commissions on issues including utility audits, regulatory economics, cost allocation, market power, retail competition, and other issues.

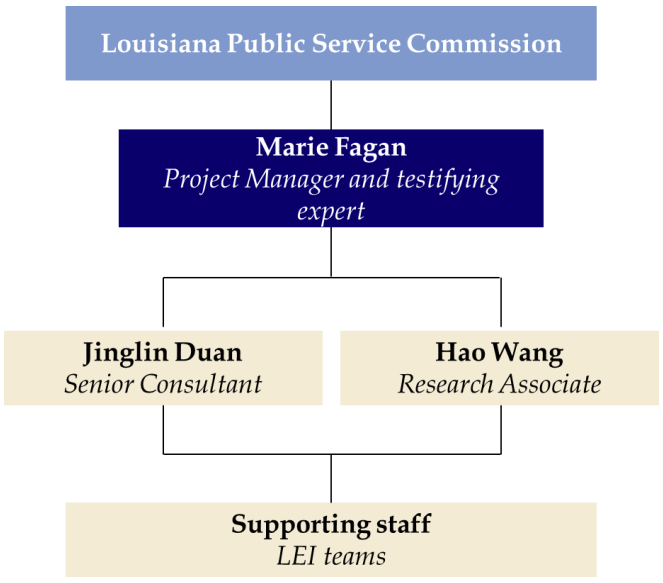
Based on the requirements of the engagement, LEI has gathered a select team of professionals with the required qualifications to assist the LPSC. The team possesses considerable independent assessment expertise, analytical and technical capabilities, experience auditing environmental compliance, and expertise in competitive power markets, including MISO.

There will be three key personnel assigned to this project. Additional staff members and resources will be available on an as-needed basis. Key staff members assigned are as follows:

- ***Marie Fagan,*** *Chief Economist*
- ***Jinglin Duan***, *Senior Consultant*
- ***Hao Wang***, *Research Associate*

Marie Fagan will have overall responsibility for the project and will act as Project Manager and testifying expert. ***Jinglin Duan*** will serve as Senior Consultant. ***Hao Wang*** will serve as a core team member. In addition, LEI staff will provide additional support as needed.

Figure 2. Proposed LEI team organization chart



1.2 Brief bios of key staff assigned to the project

Marie Fagan, Chief Economist at LEI, will serve as the **Project Manager** for this engagement, and **expert witness**. With over 30 years of experience in research and consulting for the energy sector, Marie's career has spanned international upstream and downstream oil and gas, global coal, as well as North American gas and power markets. She has advised C-suite industry clients, buy-side and sell-side financial clients, as well as legislators and regulators. For state agencies, she has served as an expert witness and managed lengthy, high profile projects.

Jinglin Duan is a Senior Consultant at LEI where she lends her knowledge and skills to the firm's technical engagements with regulators, utilities and private equity firms in the US and abroad on issues regarding project evaluation, tariff design, investment strategic consulting, litigation support, as well as power price forecasting and market analysis. Jinglin has been a key member of LEI auditing teams, examining utilities' operations, staffing, plant performance, and power market participation.

Hao Wang is a Research Associate at LEI, with experience in coordination and execution of utility management/performance auditing. Hao's experience and subject matter expertise comprises power market design, tariff design, renewable energy project evaluation, power market modeling, and market analysis. He is the primary modeler of the MISO market at the firm, including modeling the energy and capacity markets, and analyzing changes in market rules and system dynamics.

Full CVs of the key team members are available in Section 6.

2 Qualifications and experience

This section outlines LEI's understanding of the engagement and selected relevant experience.

2.1 Understanding of the engagement

LPSC is seeking audit services to investigate Entergy Louisiana, LLC's ("Entergy") monthly Fuel Adjustment Clause ("FAC") filings/calculations, identify any irregularities, including but not limited to, incorrect assessment of calculations and recovery of unauthorized expenses via the FAC by Entergy, and applied to Louisiana consumer billings. The audit includes a review of Entergy's FAC filings for the two-year period spanning January 1, 2018, through December 31, 2019. As outlined below, LEI is familiar with accounting standards and practices as well as environmental regulations for utilities and has experience analyzing the costing methodologies utilized by public service and/or utility commissions. LEI is also familiar with relevant LPSC General Orders, in particular, the FAC Order, (Docket No. U-21497), as described below.

2.1.1 Overview of ELL power system

Entergy Louisiana is part of Entergy Corporation's vertically integrated utilities segment. It is engaged in generation, transmission, and distribution activities. It owns thirteen generating plants with a total net maximum capacity of 9,143 MW as of 2018. A list of generating units operated and owned by Entergy Louisiana can be found in Figure 3 below. Entergy Louisiana serves 1,091,000 retail electric customers and provides natural gas service to approximately 94,000 customers in Baton Rouge.[1] Entergy Louisiana is a member of MISO.

Entergy Louisiana's retail electric rates are regulated by the LPSC, while its business practices are regulated by the LPSC and the Federal Energy Regulatory Commission ("FERC"). Wholesale rates of Entergy Louisiana are also under FERC regulation.

[1] 10-K report of Entergy Corporation from S&P Global Market Intelligence.

Figure 3. Generating units of Entergy Louisiana

Generating Station	Generating Unit #	Initial Operating Year	Owned and Leased Capability (MW)	Fuel for Generation
Acadia	2	2002	533	natural gas
Little Gypsy	2 & 3	1966	929	natural gas/oil
Ninemile Point	4, 5 & 6	1971	2,034	natural gas/oil
Perryville	1 & 2	2001	680	natural gas
Sterlington	7	1974	48	natural gas/oil
Waterford	1, 2 & 4	1975	872	natural gas/oil
Calcasieu	1 & 2	2000	303	natural gas
Ouachita	3	2002	245	natural gas
Roy S. Nelson	6	1982	221	coal
Big Cajun 2	3	1983	140	coal
River Bend	1	1986	967	nuclear
Waterford	3	1985	1,168	nuclear
Union Power Station	3 & 4	2003	1,003	natural gas
		Total	**9,143**	

Source: "Entergy Statistical Report and Investor Guide 2018." Entergy. 2018. <https://cdn.entergy.com/userfiles/content/investor_relations/docs/2018_Investor_Guide.pdf>

2.1.2 Fuel Adjustment Clause

The Commission's General Order, dated November 6, 1997 (Docket No. U-21497), regarding the development of standards governing the treatment and allocation of fuel costs by electric utility companies, allows utilities to pass on to its customers substantially the cost of fuel used for electric generation and the cost of power purchased for utility customers.

The FAC allows utilities to recover the cost of fluctuations in fuel costs, on an ongoing basis, without the need to conduct a full rate case. In general, utilities are prohibited from charging a rate other than the rate approved by the LPSC in a base rate case.

The implementation of the FAC allows utilities to make adjustments to the charges made to customers on a monthly basis, without the need for a base rate proceeding. The commission, however, continues to have the ability to exercise its ratemaking, ***after the fact.*** As such, the FAC costs are subject to periodic fuel audits by the LPSC. The Order provides that an audit of FAC fillings is to be performed at least every other year. [2]

[2] SEC Litigation, Other Commitments and Contingencies, and Disclosures about Guarantee. <https://www.sec.gov/Archives/edgar/data/1089819/000119312517087404/R24.htm>

The key attributes of the FAC methodology include:

1. Use of historical, actual fuel costs;
2. Use of over/under recovery to provide a "true-up" of actual, recoverable costs, to actual recovery revenues, based on jurisdictional sales, and excluding fuel costs and revenues related to the time of use and fixed price contract customers[3], which also includes a calculation of carrying charges (interest rate); and
3. Fuel adjustment clause recovery rates are implemented based on the voltage levels at which customers are connected to the grid.

2.1.3 Environmental regulations applicable to utilities

While not directly a component of the FAC, it is important to note that utilities are subject to multiple regulations, at the federal and state levels.

2.1.3.1 Federal Environment Adjustment Clause

The LPSC issued a General Order dated July 21, 2009, in Docket R-29380 Subdocket A, establishing an Environmental Adjustment Clause ("EAC").[4] Through the EAC, utilities are allowed to recover prudently incurred costs associated with the purchase and sale of air emission credits to meet Clean Air Act Amendments and the Clean Air Interstate Rule ("CAIR").[5] The Commission also made the following findings in conjunction with the promulgation of the rule:

i. The recovery of all environmental costs added to the cost of energy exchanged among affiliated utilities pursuant to a FERC-regulated tariff, where those costs were incurred prior to the adoption of this rule, will be governed as to all LPSC-jurisdictional utilities by the Commission's Order No. U-25116 (dated December 4, 2008).

ii. The costs of any credits added to the costs of energy purchased and sold between regulated affiliates that are governed by a FERC-approved tariff will be recovered by all LPSC-jurisdictional utilities in the manner specified in the Commission's Order No. U-25116 (dated December 4, 2008) and will not be recovered through the EAC.

iii. Only those costs associated with pollutants regulated by the US Environmental Protection Agency ("EPA") at the time of Commission promulgation are eligible for cost recovery under the EAC. Utilities will be required to make a specific request before any other environmental costs for new pollutants regulated under the Clean Air Act, or any other federal legislation can be recovered under the EAC. This would include those pollutants

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[3] In accordance with Exhibit B in Order No. U-21497. Source: Louisiana Public Service Commission. *Docket No. U-21497 - Louisiana Public Service Commission, ex parte. In re: Development of standards governing the treatment and allocation of fuel costs by electric utility companies.* Decided October 1, 1997.

[4] Louisiana Public Service Commission General Order No. R-29380 Subdocket A.

[5] In 2011, the US Environmental Protection Agency finalized the Cross-State Air Pollution Rule ("CSAPR") and replaced the 2005 CAIR.

that are subject to current policy debates, including greenhouse gas ("GHG") emissions. The Commission will open a separate proceeding if carbon regulation is passed by Congress and imposed upon Louisiana jurisdictional utilities.

iv. The Commission will conduct an audit at the end of the first year of the EAC to ensure that the mechanism is working properly and no unanticipated consequences rise. Audits will occur on a biennial basis thereafter.

2.1.3.2 Clean Air Act[6]

The Clean Air Act ("CAA"), established in 1970, and then amended in 1977 and 1990, is a US federal law designed to protect human health and the environment from the effects of air pollution. To protect public health and welfare nationwide, the CAA required the EPA to establish national ambient air quality standards for certain common and widespread pollutants based on the latest science.

States are required to adopt enforceable plans to achieve and maintain air quality meeting the air quality standards. State plans also must control emissions that drift across state lines and harm air quality in downwind states. Other key provisions are designed to minimize pollution from growing numbers of motor vehicles, and new or expanded industrial plants. The law calls for new stationary sources (e.g., power plants and factories) to use the best available technology and allows less stringent standards for existing sources.

2.1.3.3 Clean Air Interstate Rule and Cross-State Air Pollution Rule[7]

On March 10, 2005, the EPA enacted the CAIR, through which it intended to reduce emissions of nitrogen oxide ("NO_X"), and sulfur dioxide ("SO_2") that create ground-level ozone and particulate environmental problems in downwind states, including Louisiana.[8] In March 2006, the LPSC initiated Rulemaking Docket No. R-23980, to provide specific recommendations to the Louisiana Department of Environmental Quality ("LDEQ") for consideration in developing a state implementation plan ("SIP") for CAIR. LPSC Special Order No. 46-2006, containing specific recommendations for the LDEQ, was issued on October 11, 2006.

During the pendency of Rulemaking Docket R-29380 Subdocket A, the US Court of Appeals for the DC Circuit struck down CAIR and remanded it to the EPA to promulgate a new rule. Pending the adoption of a replacement rule, CAIR remained in place, and utilities were required to continue complying with CAIR. On August 8, 2011, the EPA promulgated the Cross-State Air Pollution Rule ("CSAPR") in response to the DC Circuit's ruling. CSAPR removed requirements

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[6] US EPA. "Clean Air Act Requirements and History." <https://www.epa.gov/clean-air-act-overview/clean-air-act-requirements-and-history>

[7] Louisiana Public Service Commission General Order No. R-29380 Subdocket A Amendment (Decided at the Commission's July 22, 2015 Business and Executive Session)

[8] Environmental Protection Agency

for Louisiana utilities to meet certain limits for ozone season NO_X. Louisiana joined multiple other parties challenging CSAPR and successfully had the rule stayed pending judicial review, keeping the requirements for CAIR in place. After three years of litigation over CSAPR, it was upheld by the US Supreme Court in 2014. On May 1, 2015, the stay was lifted, and Louisiana utilities were required to begin complying with CSAPR's requirements for ozone season NO_X emissions.

A CSAPR Update rule became final on September 7, 2016 and went into effect beginning with the May 1, 2017 to September 30, 2017 ozone season. The CSAPR Update did not replace CSAPR, it only required additional reductions in NO_X emissions from utilities in twenty-two states, including Louisiana, during the ozone season.[9]

2.1.3.4 Clean Air Mercury Rule and Mercury and Air Toxics Standards

On March 15, 2005, the US EPA issued the Clean Air Mercury Rule ("CAMR") that required significant mercury emission reductions for coal-burning power plants. These emission reductions were required in two phases: 2009 and 2015 for NO_X; 2010 and 2015 for SO_2; and 2010 and 2018 for mercury. After the promulgation of CAIR and CAMR, a series of legal challenges to those rules resulted in their replacement. CAMR was replaced with the Mercury and Air Toxics Standards ("MATS") rule which was established by the EPA in May 2011. MATS was the first national standard to reduce mercury and other toxic air pollution from coal- and oil-fired power plants. According to the EPA's projections, these rules save upward of 17,000 lives per year in the United States.[10]

In December 2018, the EPA issued a proposed revised Supplemental Cost Finding for MATS as well as the Clean Air Act requiring a "risk and technology review," which is still under consideration, as the EPA has extended the E-Reporting from power plants to July 1, 2020. After taking account of both the cost to coal- and oil-fired power plants of complying with the MATS rule (costs that range from $7.4 to $9.6 billion annually) and the benefits attributable to regulating hazardous air pollutant ("HAP") emissions from these power plants (quantifiable benefits that range from $4 to $6 million annually), as the EPA was directed to do by the United States Supreme Court, the Agency proposes to determine that it is not "appropriate and necessary" to regulate HAP emissions from power plants under Section 112 of the Clean Air Act.

Hazardous air pollutants, also known as toxic air pollutants or air toxics, are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth effects, or adverse environmental effects. The EPA works with state, local, and tribal governments to reduce air emissions of 187 toxic air pollutants to the environment.[11] The National Emission Standards for Hazardous Air Pollutants ("NESHAP") are stationary source

[9] US EPA. "States that are affected by the CSAPR." <https://www.epa.gov/csapr/states-are-affected-cross-state-air-pollution-rule-csapr>

[10] Vox. "The EPA wants to make it harder to ratchet down toxic chemicals from power plants." <https://www.vox.com/2018/12/28/18159509/mats-mercury-epa-toxic-coal-power-plant>

[11] US EPA. "What are Hazardous Air Pollutants?" <https://www.epa.gov/haps/what-are-hazardous-air-pollutants>

standards for hazardous air pollutants. The emission standards and other requirements of the MATS rule, first promulgated in 2012, would remain in place, however, since the EPA is not proposing to remove coal- and oil-fired power plants from the list of sources that are regulated under Section 112 of the Act.[12]

2.1.3.5 National Ambient Air Quality Standards

The Clean Air Act requires the EPA to set National Ambient Air Quality Standards ("NAAQS") for six common air pollutants (also known as "criteria air pollutants").[13] These sections require the EPA to:

(1) list widespread air pollutants that reasonably may be expected to endanger public health or welfare;

(2) issue air quality criteria for them that assess the latest available scientific information on nature and effects of ambient exposure to them;

(3) set primary NAAQS to protect human health with an adequate margin of safety;

(4) set secondary NAAQS to protect against welfare effects (e.g., effects on vegetation, ecosystems, visibility, climate, manmade materials, etc.); and

(5) periodically review and revise, as appropriate, the criteria and NAAQS for a given listed pollutant or class of pollutants.[14]

NAAQS's six primary pollutants include carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution, and sulfur dioxide. These pollutants are found all over the United States and are detrimental to human health and the environment. Particularly, ground-level ozone, the primary component of smog, is formed when NO_X reacts with volatile organic compounds ("VOCs") in sunlight. The EPA has identified natural and anthropogenic sources of ozone precursors (e.g., NO_X and VOCs) and ozone, including factories, lightning, power plants, vegetation, vehicles, volatile chemical products (e.g., paints and solvents), and wildfires. NO_X contributes to the formation of ozone in the atmosphere including regional ambient air non-attainment areas. Particle pollution largely consists of particulate matter ("PM"), a typical source of fine PM is PM2.5, which is measured at 2.5 micrometers or less in diameter, includes direct emissions from vehicles, smokestacks, and fires. PM2.5 contains a great portion of secondary particles.[15] The

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[12] US EPA. "Regulatory Actions – Final MATS for Power Plant." <https://www.epa.gov/mats/regulatory-actions-final-mercury-and-air-toxics-standards-mats-power-plants>

[13] US EPA. "Criteria Air Pollutants." <https://www.epa.gov/criteria-air-pollutants>

[14] US EPA. "Air Quality Criteria for LEAD (Final Report, 2006)." <https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=158823>

[15] Ozone and Particulate Matter Air Standards: EPA Review

facility's PM2.5 emissions combine with the secondary particles of PM2.5, which can be formed in the atmosphere, to contribute to regional ambient air PM2.5 emissions.

2.1.3.6 General environmental air regulations in Louisiana

Under the federal CAA, SIPs must be developed by each state that has areas that are designated nonattainment. A SIP is a plan describing how it will attain and maintain NAAQS. Included in the SIP requirements are established systems to monitor, compile, and analyze data on air quality. The EPA must approve each SIP, and the public is given the opportunity to participate in the SIP review and approval.[16]

Louisiana's air program is shaped by its SIP, which sets forth basic rules and strategies for implementation, maintenance, and enforcement of the NAAQS. As mandated by the federal CAA, Louisiana has adopted and submitted regulations to the EPA for approval and incorporation into the SIP. The Louisiana SIP was officially submitted to the EPA in January 1972 and is frequently amended to comply with the 1990 CAA amendments. The SIP focuses on permitting, emissions standards, nonattainment areas, hazardous air pollutants, and numerous other air-related requirements.[17]

The Louisiana Department of Environmental Quality's Office of Environmental Assessment, Environmental Services, and Environmental Compliance are responsible for administering and enforcing Louisiana's air regulations.

2.1.4 Familiarity with LPSC General Orders

LEI is familiar with the following General Orders:

1) The Commission' General Order dated July 21, 2009 ("FEAC Order") providing electric utilities an EAC to recover from customers certain costs of environmental compliance.

As mentioned in Section 0, the FEAC Order in Docket No. R-29380 Subdocket A provides electric utilities with a cost recovery mechanism for the purchase and sale of air emission credits needed to meet local, state, and federal environmental regulations, including the purchase or sale of air emission credits needed to comply with the Clean Air Act Amendments ("CAAA") of 1990 as well as the CAIR [18] and its successor, the CSPAR. Variable emission mitigation costs are also eligible for recovery, as the costs represent the costs of reagents such as ammonia and limestone

[16] LDEQ. "Louisiana SIP Revisions." <https://www.deq.louisiana.gov/page/louisiana-sip-revisions>

[17] Louisiana Environment-General <https://www.blr.com/Environmental/EHS-Management/Environment-General-in-Louisiana>

[18] Louisiana Public Service Commission RFP 20-05 Docket No. X-35511

that are a part of the fuel mix used to reduce air emissions, among other things.[19] This Order is aimed at explaining the rationale behind the expenses incurred by companies in compliance with environmental regulations.

The FEAC Order requires Commission Staff to audit a utility's FEAC filings periodically. The audit purpose is largely to determine (1) whether the costs passed through the Company's FEAC were prudent; (2) whether the costs were appropriate and eligible for recovery through the FEAC consistent with the Commission General Order dated July 21, 2009; (3) whether the costs passed through the Company's FEAC produced just, and reasonable rates; and (4) whether the costs passed through the FEAC were necessary for the provision of electric service to Louisiana ratepayers.[20]

2) The Commission's General Order dated March 12, 1974, prohibiting "promotional practices" by public utilities.

The General Order prohibits a public utility from giving preference to someone for the purpose of enticing them to deal with that utility over other public utilities. It is LEI's understanding that this does not apply if the action is a part of a comprehensive service policy which is applied uniformly.[21]

3) The Commission's General Order dated October 1, 1997 (Docket No. U-21497) regarding the development of standards governing the treatment and allocation of fuel costs by electric utility companies.

The General Order allows utilities to pass on to its customers substantially the cost of fuel used for electric generation and the cost of power purchased for utility customers. Recovery of the FAC costs are subject to periodic fuel audits by the LPSC. The Order provides that an audit of FAC fillings is to be performed at least every other year. [22]

2.2 Selected experience

The combination of the LEI team's management and compliance auditing expertise, experience in regulatory economics, and cost allocation, as well as familiarity with the MISO context, means that LEI is uniquely qualified to provide the services outlined in the RFP.

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[19] SEC Litigation, Other Commitments and Contingencies, and Disclosures about Guarantee. <https://www.sec.gov/Archives/edgar/data/1089819/000119312517087404/R24.htm>

[20] Louisiana Public Service Commission Docket No. U-33970

[21] <https://law.justia.com/cases/louisiana/supreme-court/1983/83-ca-1196-1.html>

[22] SEC Litigation, Other Commitments and Contingencies, and Disclosures about Guarantee. <https://www.sec.gov/Archives/edgar/data/1089819/000119312517087404/R24.htm>

This section offers projects relevant to the proposed engagement. The projects listed here are indicative of LEI's expertise and are not an exhaustive record of experience.

2.2.1 Management/performance auditing experience

LEI has performed management review and auditing services around the world, including assessment of utilities' practices, review of fuel cost mechanisms, measuring compliance with regulations, and investigation of the performance of generating assets.

- ***Mississippi fuel and energy management audit:*** LEI was engaged by the Mississippi Public Service Commission to audit the management activities of a major vertically integrated utility in the MISO region for two consecutive years. LEI assessed the utility's practices for bidding generation into the MISO wholesale markets, and for economical purchase and use of fuel and electric energy. LEI assessed fuel and energy contract terms, investigated the operations of the utility's coal and nuclear generation units, and reviewed the prudency of coal inventory levels and inventory control procedures. Following the completion of the two-year audit cycle, the Commission engaged LEI to audit the other large vertically integrated utility in Mississippi.
- ***Ohio fuel, cost, and capital expenditures audit:*** LEI was engaged by the Public Utility Commission of Ohio to perform an audit of a Power Purchase Arrangement ("PPA") rider of the Ohio Power Company (AEP Ohio) for the output of two coal plants operated by Ohio Valley Energy Company ("OVEC"). LEI examined fuel and variable cost expenditures, and capital expenditures to determine whether they were prudently incurred. LEI also examined environmental compliance activities as they related to fuel purchases. LEI compared and benchmarked AEP Ohio costs and other operational results against data from public sources. LEI also examined and benchmarked power plant performance.
- ***Assessment of fuel cost pass-through mechanisms***: LEI was retained by the Hong Kong Special Administrative Region government to assess its electricity regulatory regime, to help the Government prepare for negotiations with the utilities. LEI examined cost of capital, ratebase calculations, efficiency incentives, and fuel cost pass-through mechanisms.
- ***Independent Evaluator for Pacific Gas and Electric***: LEI was part of a pool of consultants to the Pacific Gas and Electric Company's Independent Evaluator to monitor long-term resource solicitations including affiliate, utility-owned or utility-turnkey bids. LEI worked with PG&E to ensure that Offers were evaluated consistently and in accordance with the solicitation protocol and rules of the California Public Utilities Commission ("CPUC").
- ***Ohio RECs and SRECs audit:*** LEI was engaged by the Public Utility Commission of Ohio to perform a management/performance audit of the Alternative Energy Rider of the Ohio Power Company (AEP Ohio). LEI examined processes involved in procuring RECs and SRECs. LEI compared and benchmarked AEP Ohio RECs and SRECs costs and other operational results against data from public sources.
- ***Independent benchmarking assessment of costs:*** LEI performed an independent benchmarking assessment of Ontario Power Generation's ("OPG") corporate support costs. In addition to independent benchmarking analysis, LEI supported OPG through the rate application process, in particular in the preparation of evidence, and provision of expert

testimony, supporting the reasonableness of OPG's costs for the provision of corporate support services.

- ***Assessment of distribution service costs for Ontario's utility:*** LEI, in consortium with an engineering firm, analyzed the customer density and distribution service costs for Ontario's largest utility in 2011. This engagement had three specific objectives: (i) evaluate the relationship between customer density and distribution service costs; (ii) assess whether utility's existing density-based rate classes and density weighting factors appropriately reflect this relationship; and (iii) consider, qualitatively, the appropriateness and feasibility of establishing alternative customer class definitions.
- ***Independent assessment and review:*** LEI was engaged as an external consultant to provide an independent assessment of relief sought by a client in Alberta in the matter of an arbitration under the provisions of the Arbitration Act, S.A. 1991, c. A-43.1 and the provisions of a PPA for one of its coal-fired units under section 45.95(1) of the Electric Utilities Act (Alberta). In addition to providing an independent assessment of relief sought the client; LEI undertook analysis to present the intention underlying the PPA and specific actions leading to the dispute. LEI's review also touched upon economic efficiency perspectives and explored similar examples in other jurisdictions.

2.2.2 MISO region experience

LEI closely monitors the MISO market for on-going client work. LEI also releases semi-annual regional market updates and wholesale price forecasts for eleven North American power markets, including MISO. LEI's deep understanding of the MISO market serves as a solid foundation in this management review.

- ***Asset evaluation:*** LEI was engaged by an investment firm in association with asset valuation, due diligence support, and market analysis. Work involved reviewing documents in a virtual data room, and analysis related to drivers of gross margin for the asset: macroeconomics, weather fluctuations, fuel and electricity cost projections, and overview of gas and electricity market in the MISO region where the asset was located.
- ***Long-term market outlook for MISO:*** LEI was hired by a private utility to perform an independent market analysis for a number of assets located in NYISO, MISO, CAISO, and ERCOT. LEI conducted a 20-year price forecasting horizon and provided forecasts of plants' output, load factor, and realized prices.
- ***Congestion analysis for parts of MISO:*** LEI was retained by a private client to analyze the congestion within the Chicago area and MISO zones surrounding Lake Michigan.
- ***Due diligence analysis:*** LEI was engaged by a private client to provide analytical support on their due diligence process. The supporting tasks entailed: providing an updated outlook on energy prices and intelligence on recent developments in PJM and MISO; conducting REC price forecasts; and reviewing requirements and risk exposure for hydropower facilities in capacity markets.
- ***Revenue opportunity for gas-fired cogeneration units in MISO:*** The purpose of the assignment was to inform the client of potential revenue risks associated with the plants upon

the termination of their power purchase agreements. LEI simulated MISO's energy and capacity markets and derived forecasts of wholesale energy prices and capacity prices relevant to the units' geographic location.

- ***Economic analysis for a proposed transmission project in MISO:*** LEI conducted a modeling exercise to determine the potential revenues for a proposed transmission project wheeling power from western MISO to eastern MISO (and eventually PJM). LEI evaluated both the revenue opportunities to the investors as well as social benefits to the MISO system; and evaluated the incremental value of the business strategy of selling the energy (and capacity) out of East MISO to third parties in PJM.
- ***Costs/benefits analysis of Entergy joining MISO or SPP:*** LEI was hired by the Public Utility Commission of Texas ("PUCT") to provide a cost-benefit analysis pertaining to an announced decision by Entergy to join MISO. LEI provided quantitative and qualitative analyses of specific costs/benefits attributable to Entergy Texas Inc. ("ETI") and its customers following membership in MISO versus SPP.
- ***Review of ETI's impact analysis of termination of PPA on consumers:*** LEI was hired by the PUCT to conduct a due diligence review of the analyses performed by ETI on the impact of termination of certain PPAs while a member of MISO. LEI's scope of work included a review of ETI's inputs and results, methodology, and interpretation of MISO market rules.
- ***Estimating coal plants' energy and capacity revenues in MISO:*** For a large foreign utility, LEI performed the valuation of two power plants located in the Midwest region of the US to determine their potential value upon the expiration of an ongoing PPA. The plants' revenues were calculated based on the 25-year forecasts of electricity prices in their respective zones. Given the long-term horizon of the modeling exercise, we also simulated an organized capacity market based on the Resource Adequacy requirements of MISO to estimate potential capacity revenues for the plants.

2.2.3 Expert witness experience

LEI has performed dozens of engagements involving serving as an expert witness. The work listed below is a small sample.

- ***Independent expert related to Maine Energy Cost Reduction Act:*** LEI was engaged by the State of Maine Public Utilities Commission to assist in evaluating options for expansion of natural gas supply into Maine (with a view to reducing the cost of gas and power to Maine customers). LEI reviewed and evaluated proposals for firm natural gas transportation service by pipeline developers. These evaluations included LEI's review of commercial terms included in the pipeline Precedent Agreements that underpin capacity expansion projects; review of contract provisions for Firm Transportation Agreements and Negotiated Rate Agreements; and evaluation of the status of the FERC and state-level permitting process for each pipeline proposal. The project also included natural gas network modeling (using GPCM, an industry-standard network model of the North American natural gas system) and power simulation modeling (using LEI's proprietary POOLMod model) to arrive at a quantitative cost-benefit analysis of proposals. LEI responded to discovery from other parties, prepared discovery questions and cross-examined witnesses, reviewed testimony by other

parties, and provided assessments of the issues presented and served as an expert witness in the proceedings. (2016) [MPUC Docket No. 2014-00071]

- ***Cost of capital for regulated generating assets:*** LEI provided expert testimony to the Ontario Energy Board regarding risk factors associated with Ontario Power Generation's prescribed assets, as well as creating a risk-return continuum on which power sector assets could be placed. [OEB, proceeding ID: EB-2007-0905]
- ***Advisor to Maine Public Utilities Commission on transmission cost allocation:*** LEI advised Maine Public Utilities Commission on methodologies for transmission cost allocation by comparing and contrasting alternative planning approaches and pricing models employed within the US and one international jurisdiction, the United Kingdom. The final report provided a 'strawman' recommendation for an effective cost allocation methodology. (2010) [Docket No. RM10-23-000]
- ***Independent expert assessing the role of Enbridge Line 3 for Minnesota***: LEI was engaged as the independent market expert assisting the Minnesota Department of Commerce in evaluating the application of Enbridge Energy for a Certificate of Need for its Line 3 oil pipeline expansion project. LEI provided written testimony, responded to interrogatory requests, and provided written surrebuttal and oral testimony. [Docket No. PL-9/CN-14-916, OAH Docket No. 65-2500-32764]
- ***Preparation of analysis of generation market power under FERC's indicative screens for market-based rate authorization:*** In support of the acquisition of a 21-megawatt ("MW") photovoltaic solar facility, LEI performed an updated market power analysis for acquirer's affiliates in the California ISO which have been granted market-based rate authorization, and prepared the related Section 203 filing. (2010) [ER10-204-000]
- ***Triennial market power analysis (southeast region):*** In support of a client's application to renew market-based rate authorization under the jurisdiction of FERC, LEI performed Pivotal Suppliers Analysis and Market Share Analysis for the Entergy balancing authority area. (2011) [ER97-4281 et al.]

3 Proposed plan of action

Based on LEI's previous experience working on audits and the RFP's scope of representation, LEI proposes seven tasks to structure this engagement, with a number of subtasks: Tasks 1 through 4 would be executed concurrently and the remaining Tasks 5 through 7 would be executed sequentially (see Figure 4). LEI's plan of action is discussed in detail below. This plan can be viewed as a starting point, as LEI understands that the LPSC and its Staff will have the right to determine how the tasks will be carried out.

Throughout the course of this engagement, LEI senior team members will confer with LPSC Staff in the form of periodic calls and e-mails and will be available to attend meetings in Baton Rouge as needed and/or permitted. LEI senior staff will be available to attend or lead technical conferences and conduct informal meetings with parties as needed and/or permitted.

LEI will work with the Commission Staff to ensure that LEI has access to the necessary resources (contact persons, documents, records, and so on) that will enable the conduct of the audit. If appropriate, LEI will utilize LPSC's data request procedures for issuing information requests and recoding responses, which will assist in gathering information and organizing materials.

Figure 4. Major audit tasks and subtasks /activities (proposed)

Tasks 1-4 will be performed concurrently	**Task 1: Review the Company's FAC filings and the related supporting documentation**
	Sub-task/activity
	Define criteria upon which process and results will be evaluated
	Define data needs, issue DRs, conduct meetings, conference calls
	Systematically review the Company's FAC filings
	Develop LEI's recommendations
	Task 2: Review accompanying workpapers and the Company's financial data
	Sub-task/activity
	Define criteria upon which process and results will be evaluated
	Define data needs, issue DRs, conduct meetings, conference calls
	Identify irregularities and assess calculations
	Develop LEI's recommendations
	Task 3: Review the Company's purchase and sale practices for allowances and other environmental costs
	Sub-task/activity
	Define criteria upon which process and results will be evaluated
	Define data needs, issue DRs, conduct meetings, conference calls
	Perform analytics in terms of the environmental costs and revenues
	Develop LEI's recommendations
	Task 4: Review historical data involving prior audits
	Sub-task/activity
	Define criteria upon which process and results will be evaluated
	Define data needs, issue DRs, conduct meetings, conference calls
	Review any compliance requirements included within Orders resolving prior audits
	Develop LEI's recommendations
Tasks 5-7 will be performed sequentially	**Task 5: Provide draft audit report/audit memorandum and/or pre-filed testimony**
	Sub-task/activity
	Prepare draft report/audit memorandum and/or pre-filed testimony
	Present draft report and gather comments
	Task 6: Provide final audit report and working papers
	Sub-task/activity
	Finalize report and deliver working papers
	Task 7: Provide testifying expert
	Sub-task/activity
	Attend hearings

3.1 LEI's approach to the FAC filings audit

LEI's audit will make use of the following:

- **Qualitative assessments of processes** based on the information gathered during documentation review and interview processes, as well as the professional experience of our consulting team and the pragmatic implications of the methods;

- **Quantitative assessments of results** focusing on various compliance and cost trends and management's ability to control and calculate them; and

- **Comparative analysis of results** performed using the Company's environmental costs and revenues during the review period and prior to the review period to determine any significant changes or irregularities in pricing or utilization throughout the audit period.

For each of the tasks presented in Figure 4 shown previously, LEI's audit approach will be to:

1. **Define criteria** upon which processes and results will be evaluated;

2. **Describe the Company's process,** both qualitatively and, if possible, quantitatively, based on the results of data requests and interviews;

3. **Examine and evaluate the Company's results** both qualitatively and, if possible, quantitatively; and

4. **Provide LEI's recommendations**.

3.1.1 Define criteria upon which process and results will be evaluated

LEI will develop criteria that will frame LEI's evaluation of the Company's processes and results. The following is a sample of audit criteria; not every criterion will apply to every audit area:

- Are the environmental expenses incurred properly allocated?

- Is there analytic rigor, oversight, and management attention, and documentation of cost allocation?

- Has the Company appropriately responded to environmental regulations relevant to the plants? Has this impacted fuel procurement, in terms of type and cost of fuel purchased?

- Has the Company ensured a rigorous emission allowance management strategy? What methods does the Company use to analyze environmental compliance options and strategies?

- Has the Company implemented changes that may have been recommended in previous audits?

3.1.2 Describe and analyze the Company's process

LEI will expect the Company to provide concrete examples of each relevant process (e.g., purchase and sale practices for allowances). This information may come from interviews, conference calls, and data requests. LEI will then analyze their efficacy and ensure their alignment with the FAC requirements.

3.1.3 Provide LEI's recommendations

LEI will bring to bear its audit expertise and broad experience in the power sector to frame practical suggestions for improvements, if any, are warranted.

3.2 Detailed work plan

3.2.1 Task 1: Review the Company's FAC filings and the related supporting documentation

Using the Criteria-Process-Results approach, LEI will review the Company's FAC filings, draft data requests, and review responses thereto to assess whether accounting procedures accurately and properly allocate revenues and costs in accordance with FAC requirements.

3.2.2 Task 2: Review accompanying workpapers and the Company's financial data

Using the Criteria-Process-Results approach, LEI will investigate the workpaper of the FAC filings of the Company and assess the financial data. To evaluate the reasonableness of the calculations and cost recovery, the investigation will include a comparison between the audit period and prior periods, in order to create context. LEI will also interview company personnel to obtain an understanding of processes, if needed. LEI will trace accounts to supporting documentation and re-perform calculations to verify mathematical accuracy.

3.2.3 Task 3: Review the Company's purchase and sale practices for allowances and other environmental costs

Using the Criteria-Process-Results approach, LEI will examine the Company's environmental compliance practices, including but not limited to, the involvement of the utility's parent company and/or affiliates if relevant. LEI will review the Company's accounting for such costs and revenues.

3.2.4 Task 4: Review historical data involving prior audits

LEI will use the Criteria-Process-Results approach to review the Company's historical data involving prior audits, including any compliance requirements with Orders resolving prior audits. LEI will perform analytics comparing the data in this audit period against that of prior periods to determine any significant changes or abnormalities.

3.2.5 Task 5: Provide a draft audit report/audit memorandum and/or pre-filed testimony

LEI will draft the audit report based on the information gathered from meetings, interviews, and field trips, and LEI's analysis recommendations in Tasks 1 through 4. LEI's report will be as concise as possible and will identify issues clearly, to provide the Commission staff with the information it requires.

The draft report will provide an overview of the audit, will summarize how the audit process was conducted, what the findings were, and the conclusions and recommendations for corrective actions, if any. The report will also discuss the supporting evidence and references provided to the team. The draft report will include the following information:

- Executive summary and recommendations;
- Introduction to the FAC filings audit;
- Scope, objectives, and methodology of audit;
- Documents reviewed, and people interviewed during the audit;
- Evaluation of management processes and decisions in the context of the time such decisions were made;
- Findings and conclusions which are clearly supported in the audit report;
- Identification of issues which require more explanation or examination; and
- Recommendations for corrective actions, if applicable.

LEI will send the draft to the Commission for feedback and comment; and to the Company for verification of factual statements and an indication of confidential information which will need to be redacted for a public version (if required by the Commission Staff).

3.2.6 Task 6: Provide a final audit report and working papers

LEI will finalize the audit report based on the feedback received from the Commission and the Company. LEI will prepare a "confidential" and a "redacted" version of the report.

The final report will include an executive summary of the audit, findings, and, if applicable, recommendations for corrective actions.

LEI will submit reports in the quantity and format requested by the Commission Staff.

3.2.7 Task 7: Provide testifying expert

LEI expects to present expert testimony during a hearing(s) involving the FAC filings audit report. Marie Fagan will serve as the testifying expert for this engagement.

3.3 Audit deliverables and schedule

The team expects that the engagement will start with a **kick-off meeting** that will be held over the phone, with the Commission Staff. During this meeting, the team expects that the engagement's timetable, milestones, overall expectations and format, and timing of deliverables will be discussed and finalized. Given the timeline the RFP outlines, LEI understands that the selection of consultants is anticipated to take place at an upcoming "Business and Executive Session." As such, LEI proposes the kick-off meeting be held around July 1, 2020.

LEI understands that the timeline for the scope of representation for the audit is 18 months. However, the audit is of a fairly narrow scope, and if the Commission Staff wishes LEI to complete the work in a shorter time scale, LEI can do so.

Assuming for the present the 12-month scope of representation, and given a start date of **July 1, 2020,** LEI commits to the following deliverables and target dates (see Figure **5**):

- **Written progress report** (at the approximate calendar mid-point of the audit, March 15, 2021, or date agreed-upon with the Commission staff)
- **Draft report** (August 26, 2021)
- **Final report** (November 4, 2021)
- **Complete set of working papers** (November 4, 2021)
- **Testimony** (date TBD)

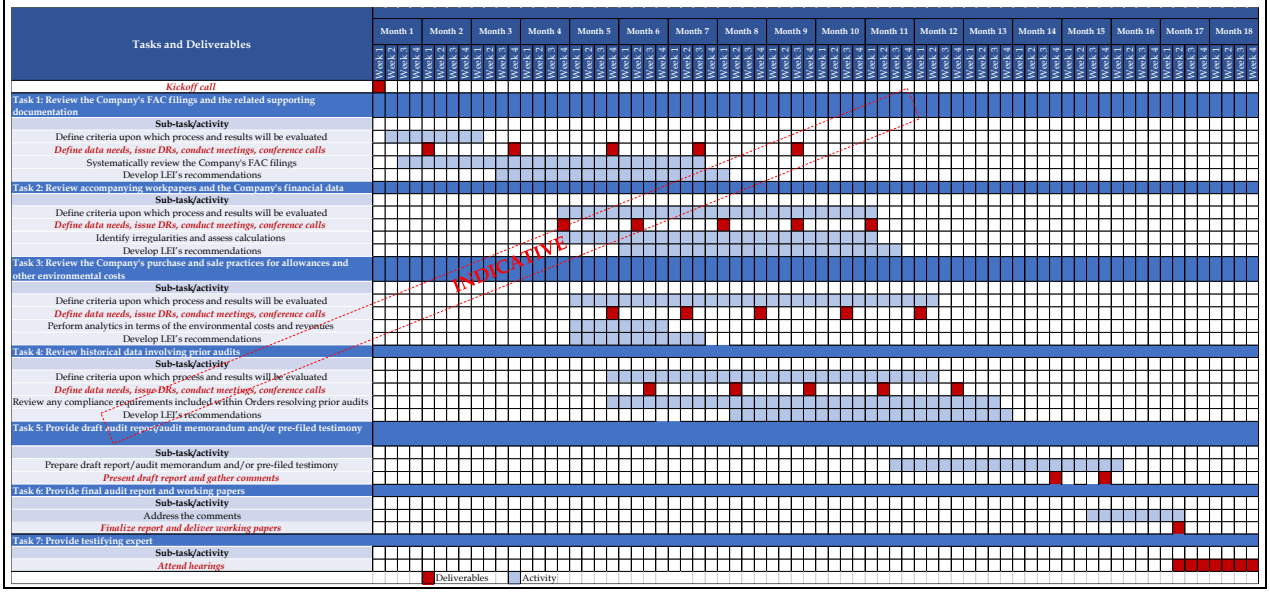
LEI will also provide **weekly** updates to the Commission staff. As noted previously, LEI will summarize progress made on required audit activities and preliminary findings.

LEI expects frequent contact with the Commission staff in the initial stages of the project when main activities will include gathering data from the Company and setting up meetings and calls with the personnel of the Company.

LEI proposes submitting a written progress report at the approximate calendar mid-point of the audit, which is approximately **March 15, 2021.** The specific due date of the interim written progress report will be discussed and agreed upon with the Commission Staff at the kick-off meeting.

LEI commits to having the appropriate experts available throughout the project from June 15, 2020, through December 2021. LEI's team will have a Project Manager for this engagement, Marie Fagan, who will liaise with the Commission Staff throughout the project.

Figure 5. Indicative work schedule and timing of deliverables, assuming 18-month scope and July 1, 2020 start date



4 Timeline and budget

LEI expects to have a kick-off meeting a few weeks after the signing of the contract. LEI would take advantage of this time to gather data and information needed to begin Task 1.

4.1 Timeline

As indicated in the RFP, the time period allowed for the matter is 12 months. LEI expects that the schedule and the deadlines will be finalized during the kick-off meeting, or shortly before or after, as noted in Section 3.3. LEI commits to having the key staff members noted in Section 1.2 available for the entire period of the project.

4.2 Professional fee budget

LEI offers a total professional fee budget not to exceed **$39,155** (see Figure 6).

Figure 6. Professional fee budget

Task	Total staff hours	Professional fee budget
Task 1: Review the Company's FAC filings and the related supporting documentation	33	$ 6,945
Task 2: Review accompanying workpapers and the Company's financial data	44	$ 9,440
Task 3: Review the Company's purchase and sale practices for allowances and other environmental costs	41	$ 8,255
Task 4: Review historical data involving prior audits	40	$ 3,710
Task 5: Provide draft audit report/audit memorandum and/or pre-filed testimony	19	$ 6,285
Task 6: Provide final audit report and working papers	15	$ 3,020
Task 7: Testimony		$ 1,500
Total, Tasks 1-7	192	$ 39,155

For Task 7, LEI's Chief Economist, Marie Fagan, could present expert testimony at any hearing at which the audit report is considered. This would be billed at an hourly rate of $300/hour. LEI is offering this at a substantial discount to LEI's current rates, as well as its discounted rates (see Figure 7). LEI will bill only for the actual costs associated with serving as an expert witness before the Commission during the applicable hearing.

Figure 7. LEI hourly rates

Position	Standard Hourly Rate	Discounted Hourly Rate
President	$750	$480
Managing Director	$740	$475
Director/ Lead Economist	$575	$370
Managing Consultant	$525	$335
Senior Consultant	$450	$290
Consultant	$325	$210
Research Associate	$210	$135
Admin	$100	$65

4.3 Expense budget

LEI estimates that the additional cost for reasonable and customary reimbursable expenses, such as (but not limited to) printing, courier, and data acquisition fees, if any, will not exceed **$600.** In addition, travel costs are estimated in Figure 8 below. LEI recognizes that given nationwide health concerns over the COVID-19 pandemic, the engagement may ultimately not involve any travel. If travel is involved, LEI will comply with all-expense caps as outlined in the State of Louisiana Division of Administration Travel Policies and Procedures Memorandum. Accordingly, the indicative travel expense budget is **$2,356**.

Figure 8. Indicative travel costs

Travel	# trips	# people	# nights	Total cost
Meetings with Commission and/or Staff	2	1	1	$1,052
Meetings with parties	2	1	2	$1,304
Total estimated costs				**$2,356**

Indicative

4.4 Total budget

The total indicative budget including professional fees, travel, and other expenses, therefore, amounts to **$42,111.**

5 Conflict of interest

LEI currently has no interest, direct or indirect, which would conflict with the performance of services under this contract and shall not employ, in the performance of this contract, any person having a conflict.

6 Resumes of key staff assigned to the project

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Curriculum Vitae

Marie N. Fagan, PhD

Chief Economist

LONDON ECONOMICS

KEY QUALIFICATIONS:

Marie Fagan is the Chief Economist at London Economics International, LLC, based in Boston, Massachusetts. With over 30 years of experience in research and consulting for the energy sector, Marie's career has spanned international upstream and downstream oil and gas, global coal, North American gas markets, and North American power markets. She has advised C-suite industry clients, buy-side and sell-side financial clients, and regulators. At LEI, Marie's expertise across electricity markets and fuels provides integrated perspectives and supports sound strategic advice for clients.

Marie leads LEI's engagements related to oil and natural gas analysis. She directs LEI's gas pipeline modeling efforts based on a sophisticated network model, supporting outlooks for natural gas prices and basis, and analysis of flows on North American interstate pipelines. She has served as an expert witness in matters involving oil and natural gas pipeline systems, which requires detailed analysis of flows, contract terms, and activities of shippers. She provides in-depth expert testimony on issues such as basis differentials, pipeline capacity and utilization in key regions, and LNG import and export supply and demand.

Marie has experience as a project manager and lead witness for complex, multi-year engagements, include a two-year project for the Maine Public Utilities Commission in 2014-2016, and a two-year project for the Mississippi Public Service Commission in 2017-2018. She has deep experience in econometric analysis, including econometric analysis for utility performance benchmarking.

Marie is a member of industry and academic associations including the Boston Economic Club, the Energy Bar Association, the International Association for Energy Economics, and New England Women in Energy and Environment. She is Vice President for Business for the US Association for Energy Economics.

EDUCATION:

The American University, Washington, DC. PhD in Economics, 1995. Dissertation: "Measuring Cost and Efficiency in US Crude Oil Resource Development, 1977-1990: A Frontier Translog Cost Function Approach

The University of Connecticut, BS in Business Administration (Finance), 1984.

EMPLOYMENT RECORD:

From: 2020 **To:** present
Employer: *London Economics International LLC*
Chief Economist

From: 2016 **To:** 2019
Employer: *London Economics International LLC*
Managing Consultant and Lead Economist

From: 2014 **To:** 2015
Employer: *London Economics International LLC*
Managing Consultant

From: 2012 **To**: 2014
Employer: *IHS Markit (formerly Cambridge Energy Research Associates)*
Senior Director, Upstream Strategy

From: 2007 **To**: 2012
Employer: *IHS Markit (formerly Cambridge Energy Research Associates)*
Senior Director, North American Gas and Power

From: 2004 **To**: 2007
Employer: *IHS Markit (formerly Cambridge Energy Research Associates)*
Director/Senior Director, CERAView Institutional Investor

From: 2003 **To**: 2004
Employer: *Cambridge Energy Research Associates*
Director, North American Gas

From: 2001 **To**: 2002
Employer: *International Human Resources Development Corporation*
Director, Global Gas Program

From: 1998 **To**: 2001
Employer: *Cambridge Energy Research Associates*
Associate Director, Global Oil

From: 1996 **To**: 1998
Employer: *Cambridge Energy Research Associates*
Associate, Global Oil

From: 1994 **To**: 1996
Employer: *Energy Information Administration*
Economist

From: 1991	**To**: 1994
Employer:	*Decision Analysis Corporation of Virginia* Associate
From: 1989	**To**: 1990
Employer:	*Decision Analysis Corporation of Virginia* Research Associate
From: 1988	**To**: 1988
Employer:	*United States Department of Energy* Intern, Office of Policy Planning, and Analysis

RECENT PROJECT EXPERIENCE:

The projects briefly described below are typical of the work Marie Fagan has performed at London Economics International.

Auditing and procurement oversight

- ***led management performance audits of Entergy Mississippi and Mississippi Power Company.*** Marie served as director and project manager for an engagement with the Mississippi Public Service Commission ("MPSC") to conduct a two-year audit of the annual management activities of Entergy Mississippi, major vertically integrated utility in the MISO region. Marie's team assessed the utility's practices for economical purchase and use of fuel and electric energy, assessed relevant fuel and energy contract terms, assessed the companies strategies for offering into the MISO energy market, investigated the operations of the utility's coal and nuclear generation units, reviewed the prudency of coal inventory levels and inventory control procedures. The team also assessed plant performance for coal and gas-fired plants. Following the conclusion of the two-year audit cycle, the MPSC engaged LEI to audit the Mississippi Power Company, the other major utility in the state.

- ***directed management performance and financial audits of Ohio Power Company.*** Marie served as project director for an engagement with the Public Utility Commission of Ohio to perform an audit of a PPA rider of the Ohio Power Company (AEP Ohio) for the output of two coal plants operated by Ohio Valley Energy Company ("OVEC"). The team examined fuel and variable cost expenditures, and capital expenditures to determine whether they were prudently incurred. Marie's team also examined environmental compliance activities as they related to fuel purchases and compared and benchmarked AEP Ohio costs and other operational results against data from public sources. Additionally, the team examined and benchmarked power plant performance.

- ***independent evaluator for solar procurement:*** for PacifiCorp, Marie led the independent evaluator team for PacifiCorp's system-wide 2017 Solar RFP. The project included a review of PacifiCorp's Solar RFP, the facilitation and monitoring of communications between

PacifiCorp and bidders, performing a review of the initial shortlist and final shortlist evaluation and scoring.

- ***analysis of the macroeconomic impact of biomass electric power generation:*** for Maine Public Utility Commission Docket No. 2016-00084, Marie conducted a macroeconomic study comparing the impacts of a bids related to biomass power procurement. Marie used the IMPLAN model to estimate impacts on direct, indirect, and induced jobs; payments to the state and to municipalities; payments for fuel harvested in the state, and other macroeconomic impacts.

Econometric analysis and benchmarking

- ***econometric benchmarking analysis of gas distribution utility performance:*** LEI was engaged by an investor-owned local gas distribution company to support its rate filing for performance-based ratemaking. Marie led an econometric benchmarking analysis of utility performance in terms of O&M and capital costs. The econometric analysis used a transcendental logarithmic ("translog") cost function to help set expectations for further efficiency improvement, for use in the setting of the *X*- factor.

- ***econometric benchmarking analysis of generation unit performance:*** LEI was engaged by a Canadian hydropower generation company to support its rate filing. Marie led an econometric benchmarking analysis of unit-level O&M costs for a cross-section of over 300 hydropower generation units.

- ***econometric analysis of oil demand:*** Marie led a comprehensive study of price and income elasticities of oil demand for Columbia University's Center on Global Energy Policy ("CGEP"). The foundation of the study was a detailed econometric analysis which employed variety of specifications of econometric models, including static and dynamic models, symmetric and asymmetric models, and tests of time-series properties of the data. The scope of the work encompassed separate models for crude oil, gasoline, and diesel demand, and relied on combined cross-section time-series data for OECD and non-OECD countries.

Crude oil and natural gas pipelines

- ***evaluation of the costs and benefits of expansion of natural gas pipelines into New England:*** For the Maine Public Utilities Commission, Marie led analysis of the costs and benefits of a number of contracts for firm transportation ("FT") service on natural gas pipelines. She reviewed pipeline precedent agreements and rate agreements and provided a qualitative analysis and comparison of contracts offered. She led the quantitative analysis of the impacts of pipelines on gas and power prices, which was underpinned by LEI's proprietary simulation model of the New England power system ("POOLMod"), combined with a widely-used industry standard model of the gas pipeline system (known as "GPCM"). She provided insight and direction of research in gas price basis differentials, pipeline capacity and utilization in key regions, and LNG import and export supply and demand.

- ***independent expert in assessing role of Enbridge Line 3 for Minnesota:*** Marie served as independent market expert assisting the Minnesota Department of Commerce in evaluating

the application of Enbridge Energy for a Certificate of Need for its Line 3 oil pipeline expansion project (Docket No. PL-9/CN-14-916, OAH Docket No. 65-2500-32764). Marie's analysis covered global and local trends in refined product demand and crude oil supply, refinery utilization rates and utilization of high-conversion refinery capacity in Petroleum Administration for Defense District ("PADD") 2 and in the local Minnesota region. Her analysis required detailed examination of the assumptions and methodology of an oil pipeline linear programming-based model, in order to assess another witness's testimony which relied on the model. Marie provided written testimony; responded to interrogatory requests, provided written surrebuttal, and oral testimony.

- ***independent research into the role of Enbridge Line 5 in NGLs and crude oil transport in Michigan:*** For a non-governmental organization ("NGO") Marie produced three white papers examining the current and future role of Enbridge Line 5 in Michigan related to three issues: propane supply in Michigan, transportation for crude oil producers in Michigan, and supply of crude oil to Michigan-area refineries. Marie's analysis of the propane market included a comparative static econometric analysis of the supply and demand from propane in Michigan, explained in non-technical language. The white papers were used by the client in discussions with the Governor of Michigan and other stakeholders.

- ***analysis of Western Canadian natural gas costs and production:*** LEI was retained by counsel to provide support in the matter of NOVA Gas Transmission Limited ("NGTL")'s application to the National Energy Board ("NEB"). LEI reviewed evidence and prepared testimony: Marie led analysis of the natural gas and natural gas liquids ("NGLs") market in Alberta and British Columbia, and the impact of a pipeline surcharge on producers of natural gas.

Expert testimony

- ***expert witness report in support of litigation:*** In Case 15CV-04225 in the District Court of Johnson County, Kansas, LEI was retained by counsel to examine the value of the green attributes of landfill gas ("LFG") produced by a project in Kansas City, Kansas, and sold under long-term contract to the Sacramento Municipal Utility District ("SMUD"). Marie's report demonstrated several flaws in the methodology of the opposing counsel's expert witness. Marie proposed an alternative, more appropriate methodology for valuing the green attributes of LFG, based on market fundamentals driven by the California RPS requirements.

- ***independent expert in assessing role of Enbridge Line 3 for Minnesota:*** Marie served as independent market expert assisting the Minnesota Department of Commerce in evaluating the application of Enbridge Energy for a Certificate of Need for its Line 3 oil pipeline expansion project (Docket No. PL-9/CN-14-916, OAH Docket No. 65-2500-32764). Marie's analysis covered global and local trends in refined product demand and crude oil supply, refinery utilization rates and utilization of high-conversion refinery capacity in Petroleum Administration for Defense District ("PADD") 2 and in the local Minnesota region. Her analysis required detailed examination of the assumptions and methodology of an oil pipeline linear programming-based model, in order to assess another witness's testimony which relied on the model. Marie provided written testimony; responded to interrogatory requests, provided written sur-rebuttal, and oral testimony.

- ***independent market expert, and expert witness for public utilities commission:*** For the Maine Public Utilities Commission, in the evaluation of the costs and benefits of alternatives for expansion of natural gas supply into Maine (MPUC Docket #2015-00071), Marie authored reports provided to the Commission; responded to discovery from other parties; prepared discovery questions and cross-examined witnesses; reviewed testimony by other parties and provided assessments of the issues presented; and served as an expert witness in the proceedings.

ERCOT/Texas power market

- ***assessment of political support for large-scale transmission expansion:*** to support due diligence for an investor interested in wind assets in ERCOT, Marie examined the political, legislative, and economic drivers of ERCOT's Competitive Renewable Energy Zones ("CREZ") and provided an assessment of state-level support for further expansion of CREZ transmission lines. She also provided assessment of and outlook for ERCOT's and the Public Utility Commission of Texas's views of the "system cost" (the potential increased need for ancillary services and firm capacity) of wind.
- ***investment environment for transmission in ERCOT***: LEI was engaged by a European utility to examine the investment environment for transmission in ERCOT. Marie's team provided a detailed report covering agents and institutions, the regulatory and legal framework, remuneration of investment, and transmission planning.
- ***forecast of potential energy revenues of two wind farms in Texas:*** LEI used its proprietary dispatch model, POOLMod to project energy prices for the West zone in ERCOT. Marie led the project, and also examined the implications of the PPA related to the two wind farms.

Market rules and practices

- ***analysis of key characteristics of capacity markets:*** To support Board-level understanding of the implications of potential capacity market designs in Alberta, Marie prepared a detailed review and comparison of capacity markets across international and North American jurisdictions. Report concluded that "the devil is in the details" of capacity market design. Market design details with potentially large impacts on the client were resource eligibility definitions, price setting mechanism, demand curve design, performance requirements, and market power mitigation rules.
- ***advisory on a wide variety of market rules and regulatory risks:*** LEI was engaged to support a client's Regulatory Group in its administering of the company's compliance program. This involved creating and delivering a monthly report covering developments by regional market and traded products which included: energy, capacity, long-term transmission service, FTR auctions, ancillary services, diesel oil, PRB coal, natural gas commodity, transmission, and storage, RECS, and CO2. Marie served as project manager and executive editor of the monthly report.
- ***advisory for an investigation related to the timing of outage scheduling:*** For a law firm, Marie provided research and expertise covering US Federal Energy Regulatory Commission

("FERC") practices related to monitoring, enforcement, and definition and prosecution of alleged market manipulation.

- ***advisory to provincial government:*** LEI was engaged to perform analysis of the organization and governance of electricity systems both cross-jurisdictionally and within the province of Nova Scotia. Marie provided a review of the Nova Scotia gas and power sectors, including governing institutions, the legal and regulatory framework, recent developments and challenges, and SWOT analysis.
- ***advisory to UK Department of Energy and Climate Change:*** Marie participated in an evaluation of auction design for the UK DECC. The UK market regulator was interested in whether US power markets evaluate capacity bids based on criteria other than the price bid, specifically, if the length of contract had a role in the auctions. Marie reviewed capacity market auction rules for PJM, ISO-New England and the New York ISO, as well as international spectrum auctions, North American gas transmission open season rules, and international auctions for toll roads.

Electricity and natural gas asset valuation and transaction advisory

- ***evaluation of behind-the-meter solar business models:*** to support a client's due diligence related to a potential investment in business-to-business behind-the-meter solar in the Northeast United States, Marie led a project examining US federal and state incentives for solar adoption, and assessed business models used for targeting commercial, institutional, and industrial sectors. Marie's team also developed key questions the client should ask, as part of its evaluation of potential transactions in the solar sector.
- ***evaluation of contracts for firm gas transportation capacity:*** For plants located in Virginia and Connecticut, Marie evaluated the value of firm transportation and interruptible transportation legacy contracts. The client also retained LEI to forecast delivered gas prices in New England (Connecticut) and PJM (New Jersey) and locational marginal prices as well as retail electricity prices in Connecticut. Marie led the gas market analysis for this project.
- ***assessment of congestion/curtailment risk:*** Marie led a project for a wind developer, providing a quantitative assessment, of congestion/curtailment risk for a wind asset in New England. LEI incorporated information from the interconnection impact study to examine system limits and provided an assessment of risk of outages based on NERC outage data for NPCC.
- ***forecast of reserves market prices:*** To support potential acquisition of hydropower assets, Marie provided analysis of ISO-New England's Locational Forward Reserves Market.
- ***due diligence related to a district cooling asset:*** Marie reviewed contracts and developed a model for projecting revenues and gross margins for the asset. Marie provided insight by identifying the potential for lower customer contract prices at renewal (in contrast to the seller's assumptions) and other areas of revenue risk.
- ***Long-term outlook for Japan electricity sector:*** LEI was engaged by a private equity company to prepare a brief, fact-based report that would help support a view of wholesale electricity

prices in Japan after 2040. Marie authored the report, which covered i) the structure of Japanese electric power industry, and ii) the status of de-regulation and environmental policy. Based on this, Marie developed two reasonable scenarios for wholesale prices based on two different paths for energy supply to 2040 and beyond.

Curriculum Vitae

Jinglin Duan

Senior Consultant

KEY QUALIFICATIONS:

Jinglin is a Senior Consultant at London Economics International LLC ("LEI"), where she lends her knowledge and skills to the firm's technical engagements with regulators, utilities and private equity firms in the US and abroad on issues regarding project evaluation, tariff design, investment strategic consulting, litigation support, as well as power price forecasting and market analysis. Specifically, Jinglin is responsible for modeling regional and national social and economic impacts for electric projects using REMI PI+ and is the primary electricity market modeler for the New England (ISO-New England), Southeast US (SERC) and Florida (FRCC) regions. Jinglin has also been actively engaged in statistical analysis, regulatory study, as well as financial analysis for different aspects of the power sector.

Jinglin obtained her bachelor's degree in environmental science at Peking University and her master's degree in public administration at Columbia University, with a special focus on environment & energy. Before joining LEI, Jinglin has worked at J.P. Morgan Chase & Co. as an operational risk management consultant.

EDUCATION:

Columbia University, New York, NY, M.P.A. in Development Practice.

Peking University, Beijing, China, B.S. in Environmental Science

EMPLOYMENT RECORD:

From: 2019	**To:** present
Employer:	*London Economics International LLC, United States* Senior Consultant
From: 2016	**To:** 2019
Employer:	*London Economics International LLC, United States* Consultant
From: 2015	**To:** 2016
Employer:	*London Economics International LLC, United States* Research Associate
From: 2015	**To:** 2015
Employer:	*JP Morgan Chase & Co, United States* Operational Risk Consultant

From: 2014 **To:** 2015
Employer: *Earth Institute, Columbia University, United States*
Associate and Program Developer

From: 2014 **To:** 2015
Employer: *United Nations Development Programme, United States*
Intern, Environment and Natural Capital, Pvt Sector Engagement

SAMPLE PROJECT EXPERIENCE:

Utility audit:

- ***Management and fuel audit of a major utilityin the Southeastern US:*** LEI was engaged for a two-year term to conduct the annual management audits of the oil, gas, coal, nuclear fuel, and energy procurement activities of Mississippi Power Company. Jinglin, as part of the LEI team, assessed a complex array of issues including the utility's staffing, organization, risk management, and fleet operations.
- ***Management and fuel audit of a major utility in MISO:*** LEI was engaged in a management audit of the fuel (gas, coal, and nuclear) and energy procurement activities of a major vertically-integrated utility in MISO. The team assessed fuel and energy contract terms, and reviewed the prudency of coal and nuclear fuel procurement and inventory practices. In addition, the team also assessed management, organization, controls, strategies, and outcomes for the company's hourly MISO offers. As part of the team, Jinglin examined the utility's operations and compliance in MISO, investigated the fuel procurement, inventory, and operations of a nuclear power plant, and the financial implications of the utility's power purchase agreement for nuclear power.

Economic study and financial modeling:

- ***Energy infrastructure investment advisory:*** For a private equity client, LEI conducted an extensive project reviewing a wide range of investable energy sectors in the United States and Canada. The sectors included: electricity generation (natural gas, wind, solar, hydro), AMI, distributed resources, demand response, retail energy, gas LDCs, gas storage, gas pipeline transportation, LNG-related infrastructure, vertically-integrated utilities, electric distribution utilities, and water utilities. Jinglin assessed the investment potential of five sectors (including electricity transmission, distribution, storage, gas transmission and distribution), and of the Southeast US power market for the next five years, and proposed a methodology to screen and identify investment opportunities and execute on these opportunities.
- ***Study of the net going forward fixed costs for nuclear and offshore wind in New England:*** LEI is being retained by the New England States Committee on Electricity ("NESCOE") to study the New England wholesale electricity market dynamics under five scenarios of varying infrastructure investments and retirements. The analysis will be used to inform New England states on electricity policy issues under different scenarios. Jinglin worked as part of the team on refining the excel-based model for calculating the Net Going Forward Fixed Costs for nuclear and offshore wind generating units. Specifically, Jinglin examined company financial

reports and relevant studies on ROE, PI risk, negative price risk, O&M, and CapEX schedule, etc.

- ***Evaluation of cross-check financial models for bids review:*** LEI was hired by the kfW as part of a consortium with the Frankfort School of Finance to assist ERA in developing a streamline process to review eligible technology types under RE-FIT program as well as training ERA staff on-site in best practice financial models, methodology and tools for this process. LEI's scope of work included designing and standardizing generic financial models to evaluate bids for large hydropower plants. Jinglin as part of the LEI team helped review and revise the financial model. Jinglin worked on evaluating and refining the Excel-based financial model. Besides, Jinglin also designed the user guide manual and training materials.
- ***Econometric study on energy demand and its implication on future demand:*** London Economics International LLC ("LEI") has been engaged by the Columbia University Center for Global Energy Policy for an econometric study on how the demand for energy evolves and reacts to GDP growth, fuel prices, and other factors. LEI examined OECD and non-OECD countries using panel data, and also looked into China and the US separately. LEI adopted asymmetric models in order to capture the difference in response towards increase, decrease, and shocks GDP and fuel prices. Jinglin worked on data gathering and cleaning, model design, and performing STATA analysis.

Macroeconomic study, cost-benefit analysis:

- ***Identifying and measuring the life-cycle benefits of infrastructure investment:*** WIRES commissioned London Economics International LLC ("LEI") to prepare a study demonstrating the benefits of transmission investment. The benefits of transmission are frequently seen as uncertain by many policymakers and regulators; system planners have also found it a challenge to comprehensively measure benefits and identify beneficiaries. This study shows that a variety of benefits can be quantified robustly through forward-looking, simulation-based analysis. Moreover, these benefits are substantial, widespread, and long-lasting – putting dollars in the pockets of households, businesses, and governments. Jinglin was responsible for estimating the socio-economic benefits of two hypothetical transmission projects through designing the project configurations and capital costs and performing macroeconomics modeling. Jinglin also led the editing of the of the paper and preparing for presentations.
- ***White paper for debunking myths surrounding transmission investment:*** WIRES commissioned London Economics International LLC ("LEI") to provide a White Paper to identify and debunk the myths (i.e. outdated or inaccurate understanding) about transmission investment and prove the truth with real-world cases studies. In order to offer a more accurate portrayal of the need to invest in transmission infrastructure, this White Paper concludes with recommendations for practical and feasible improvements to the process of evaluating transmission projects. Jinglin was responsible for researching on real-world examples, identifying common myths, as well as leading the writing and editing of the paper. The paper is publicly available at www.wiresgroup.com.
- ***Macroeconomic impact evaluation for a transmission project in New England:*** LEI was retained by a major New England electric utility to evaluate the costs and benefits of several

transmission solutions that would import power into New England. Jinglin was involved in modeling the socioeconomic impacts, including jobs creation, GDP growth, and environmental impacts, of this project in all six states of New England using the REMI PI+ model. Jinglin has also supported LEI's expert testimony work on behalf of Eversource Energy.

- ***Social & economic benefits analysis for a proposed transmission project:*** LEI was retained to conduct a comprehensive cost-benefit analysis of a proposed transmission project in New England using simulation-based analysis of the ISO-NE wholesale power markets. LEI's analysis included detailed examination of the benefits to consumers from lower energy and capacity prices, as well as emissions reductions and local economic impacts (associated with spending during construction and lower retail costs of electricity). As the REMI modeller at LEI, Jinglin worked on analyzing the local economic benefits as part of a team and supported the testimony process by addressing data request questions.

Tariff design and regulatory study:

- ***Benchmarking study for North American hydro utilities:*** LEI was engaged to support Ontario Power Generation in relation to its second-generation hydroelectric payment amounts price-cap application before the Ontario Energy Board ("OEB"). Jinglin led the econometrics-based benchmarking study hydro utilities in the US and Canada and develop rankings based on each utility's relative efficiency.

- ***Strategy advisory on a gas utility's IBR submission:*** Jinglin worked with the LEI team in providing strategic advisory to the client in terms of the IBR components to consider in the filing. Jinglin worked on building the model for calculating the total productivity factor for the US gas utility sector and conducting an econometrics-based benchmarking for assessing the utilities' relative efficiency.

- ***Study on effective carbon prices:*** As part of a consortium, LEI was hired by the Singapore National Climate Change Secretariat ("NCCS") to undertake a study on effective carbon prices faced by energy-intensive manufacturing sub-sectors in jurisdictions across Asia, Middle East, Europe, and North America. Specifically, LEI was tasked with studying carbon policies in China, Middle East, Taiwan, USA, and Canada. The deliverables, consisting of a report and a dashboard tool, allowed the NCCS to compare effective carbon prices across competitor jurisdictions in these key manufacturing sectors and thus inform current and future policy decisions regarding the level of Singapore's carbon price and wider climate change policy. Jinglin is in charge of studying electricity market rules and carbon policies for six juristictions in China.
- ***Case study of wheeling rates in South Asia:*** LEI was engaged by TNB in Malaysia to work as the project manager of its Incentive-Based Regulation ("IBR") submission for the 2nd regulatory term. LEI's role in this project includes two phases. As part of the LEI team, Jinglin helped preparing the proposal and worked on Phase I of the project. Specifically, for Phase I, Jinglin worked on reviewing the Distribution and transmission wheeling rates of TNB, and conducted a side-by-side comparison of the regulatory and tariff framework in other jurisdictions including the Philippines, Australia, and the UK. Results of the case studies and

comparison were presented to the TNB management, as part of LEI's advisory work on proposing enhancement for the Malaysian Regulatory Implementation Guidelines.

- ***Study of regulatory changes and market development in the Midwest U.S. electricity market:*** Rye Development hired LEI to provide analytical support on their due diligence process. The supporting tasks entailed: providing updated outlook on energy prices, as well as intelligence on recent developments in selected US power markets (PJM and MISO), documenting in a memo LEI's REC price forecasts, and reviewing requirements and risk exposure to hydropower facilities in selected capacity markets. Jinglin wrote the summary for recent development in the MISO market and the implications.

SPEAKING ENGAGEMENTS AND PUBLICATIONS:

"Estimating Macroeconomic Benefits of Transmission Investment with the REMI PI+ Model" Presented at the REMI Webinar.

"Modeling positive externalities from carbon reduction in the energy sector using the REMI PI+ New England regional model" Presented at the 2017 REMI Conference on "Policy in the Trump Era – Energy, Economy and the Environment"

"How Does Electric Transmission Benefit You? Identifying and Measuring the Life-Cycle Benefits of Infrastructure Investment." January 8, 2018. Published by the WIRES Group. http://www.wiresgroup.com/docs/reports/WIRES_LEI_TransmissionBenefits_Jan2018.pdf

"The Truth about The Need For Electric Transmission Investment: Sixteen Myths Debunked." September 2017. Published by the WIRES Group.

Curriculum Vitae

Hao Wang

Research Associate

KEY QUALIFICATIONS:

Hao is a Research Associate at London Economics International LLC ("LEI") Boston Office, where he applies his industry knowledge and analytical skills to the firm's technical engagement with government bodies, state regulators utilities, and private investment firms in the US and abroad on a wide range of issues including power market design, tariff design, renewable energy project evaluation, power market modeling, and market analysis.

He is the primary modeler of Midcontinent Independent System Operator ("MISO") market, one of the world's leading Regional Transmission Organizations ("RTOs") and the largest geographical organization of its kind. He is responsible for modeling the energy and capacity markets and analyzing changes in market rules and system dynamics.

Hao holds a Master of Public Administration (MPA, Energy and Environment) degree from Columbia University, and a Bachelor of Arts degree in Spanish Language and Literature from Tianjin Foreign Studies University (China).

Prior to joining LEI, Hao worked for a community solar marketplace in Brooklyn, NY and a municipal bonds underwriter in Wallstreet, NY. Hao has extensive travel experiences in 40 countries across five continents and he is fluent in English, Spanish, and Mandarin.

EDUCATION:

Columbia University, New York, New York, M.P.A in Public Administration (Energy and Environment)

Universitat de Lleida, Lleida, Catalonia, Spain, Exchange Program in Spanish Language and Literature & Journalism

Tianjin Foreign Studies University, Tianjin, China, B.A. in Spanish Language and Literature

EMPLOYMENT RECORD:

From: 2019 **To:** present
Employer: *London Economics International LLC, United States*
Research Associate

From: 2019 **To**: 2019
Employer: *PowerMarket, Brooklyn, NY, United States*
Energy Data Analyst

From: 2019	**To**: 2019
Employer:	*Samuel A. Ramirez & Co., Inc., NY, United States* Graduate Consultant
From: 2019	**To**: 2019
Employer:	*Columbia University, New York, NY, United States* Teaching Assistant (Corporate Finance)
From: 2018	**To**: 2018
Employer:	*Center on Global Energy Policy, Columbia University, United States* Research Assistant in Carbon Tax Initiative
From: 2018	**To**: 2018
Employer:	*AeroSpec Technologies, LLC, Boston, MA, United States* Business Development Intern
From: 2014	**To**: 2017
Employer:	*National Centre for the Performing Arts, Beijing, China* Project Manager
From: 2013	**To**: 2014
Employer:	*Embassy of Mexico in China, Beijing, China* Assistant in Cultural and Educational Section
From: 2013	**To**: 2013
Employer:	*Ministry of Agriculture of China, Beijing, China.* Project Intern

SAMPLE PROJECT EXPERIENCE:

The projects briefly described below are typical of the work Hao has performed throughout his career at London Economics and Columbia University.

Power purchase agreement ("PPA") rider audit

- ***Independent audit of the PPA rider of Ohio Power Company.*** LEI was retained by AEP Ohio to provide audit services to establish the prudency of all of the costs and sales flowing through the PPA rider and to investigate whether the AEP Ohio's actions were in the best interest of retail ratepayers. Hao, in particular, was focused on the environmental regulations and compliance requirements in Ohio and used the Criteria-Process-Results approach to review AEP Ohio's share of OVEC's environmental compliance activities, as they pertain to fuel and reagent procurement and utilization. Hao also managed the process of issuing data requests, keeping files and information organized, and ensuring a smooth and efficient process.

Policy impact study

- ***Evaluation of the impact of tax reform on Kansas' utilities.*** LEI was retained by the Kansas Legislative Coordinating Council ("LCC") to perform a study of the retail rates of Kansas electric public utilities. Hao assisted in the overview of Kansas taxes on utilities and analyzed the pros and cons of tax cut to utilities and ratepaying customers. Eventually, Hao provided a comprehensive analysis about how much taxes impact the competitiveness of utility tariffs.

Stranded cost assessment

- ***Extensive research on MISO and PJM transmission rules and energy marketers.*** LEI was retained by Tipmont REMC ("Tipmont") to calculate the potential stranded cost for Wabash Valley Power Association ("WVPA") as a result of the departure of Tipmont's load. Stranded costs represent costs which a utility (in this case, WVPA) would have recovered through regulated rates, but the recovery of which may be now be impeded because of regulatory changes or other circumstances. In recent years, termination of long-term arrangements between the utility and a customer have created stranded cost issues. Hao conducted extensive and detailed research on the interregional transmission rules in MISO and PJM markets, Financial Transmission Rights ("FTR"), Auction Revenue Rights ("ARR") process, wheeling costs etc.

Renewable energy tariff options examination

- LEI was retained by the Louisiana Public Service Commission to examine renewable energy tariff options with a focus on bringing new renewable resources into Louisiana. Hao was conducting research on renewable tariffs applied in different jurisdictions across the United States, demand response ("DR") programs, as well as osmotic pressure electric generation (also known as "blue energy").

Power market modeling

- As the primary modeler for Midcontinent Independent System Operator ("MISO") market, Hao is conducting a ***semi-annual MISO market updates and 10-year energy price forecasts*** for MISO. In addition to providing price projections, the reports highlight major developments in each of the regions as well as the underlying structural dynamics.

Electricity market and carbon tax analysis

- ***Analyses of the demand response application in different ISOs/RTOs in the US market*** based on sizes, locations, players, potential partnerships, as well as prevailing technologies. Hao also provided a set of assessments of business investment focus strategies.

- ***Research on the interactions between carbon tax and existing policies and regulations in the U.S.*** with a particular focus on the "Curbelo Proposal" to roll out the carbon pricing bill. I also prepared case studies on the phenomenon of single industry dependent economies on the county-level to report lessons learned from successful and failed cases to help alleviate the loss from coal phase-out to the U.S. coal communities.

Green bond program evaluation

- ***Development of a four-phase implementation plan for a multi-state tax reciprocity program*** and proposed best practices to help scale up U.S. green municipal bond issuance. Hao was also involved in the quantitative cost-benefit analysis model to reflect the net present value and benefit cost ratio of the program and estimation of state by state trade-off by analyzing relevant data, and testing for sensitivity to different methodologies and assumptions under the program to scale the market.